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ABSTRACT

This paper describes a study that examined parents' beliefs about children's number skill development. Twenty-seven parents of 4- and 5-year-olds were interviewed about number tasks that could be solved by children between the ages of 4 and 7 years. In addition, parents were asked a series of open-ended questions about how they would answer a child's questions about math, their own experiences with math, and their expectations for their children's performance in math. Parents predicted that children would solve counting tasks prior to computational and number concept tasks. They expected that their own children would solve all types of number tasks earlier than other children. In addition, parents of boys expected them to solve all tasks earlier than did parents of girls. Finally, they believed that parents and schools have the most impact on early number development. It appears that parental beliefs concerning number development best fit a socialization model that emphasizes the importance of adults. Four tables showing analysis of variance are included. (GLR)

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Parental Beliefs About the Development of Preschool Children's Number Skills

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Abstract

What do parents of preschool children believe about how children develop number skills? The socialization literature suggests that parental beliefs influence the environment parents provide. Much of the number development literature suggests that many of children's early number skills are intuitive and develop with little direct intervention from parents. Which of these two views most closely matches parents' beliefs?

In order to assess parents' views we interviewed 27 parents of 4- and 5-year-olds about number tasks that could be solved by children between the ages of 4 to 7. Parents were also asked a series of open-ended questions about.

Parents predicted that children would solve counting tasks prior to computational and number concept tasks. They expect that their own children will solve all types of number tasks earlier than other children. In addition, parents of boys expected them to solve all tasks earlier than did parents of girls. Finally, they believed that parents and schools have the most impact on early number development. It appears that parental beliefs concerning number develop-

ment best fit a socialization model that emphasizes the importance of adults.

Aims

The socialization literature suggests that parental beliefs are related to parental actions and thus influence the environment parents provide for their children. However, much of the number development literature suggests that many of children's early number skills are intuitive and develop with little direct intervention from parents. What do parents of preschool children believe about when and how children develop number skills? When and how they think children learn about numbers may lead to children experiencing different learning environments--which in turn may influence when and how they actually do acquire these skills.

This study addresses four questions:

1. When do parents think children solve tasks related to counting, number concepts, and computation?

2. Do parents make different predictions about the acquisition of skills by their own children versus the average child?

3. Do parents of girls make different predictions than parents of boys about their children's acquisition of number skills?

4. What do parents think are the main influences on the development of children's number skills?

Method

Subjects: The participants consisted of 22 mothers and 5 fathers with an average of 15 years of education. The 27 children of the participants had an average age of 4 years 10 months (range 4-2 to 5-10) and consisted of 17 girls and 10 boys. The average number of days in day care per week were 4 (with over 90% of group spending 4 or 5 daysper week in day care).

Procedure: Parents were shown nine tasks (three concept tasks, three computation tasks, and three counting tasks) that children typically perform for the first time sometime between the ages of 4 to 7 years. At first, parents were asked to think of the typical child when responding to all nine tasks: then all tasks were readministered and they were asked to think of their own child.

For each task they were asked to:

(a) estimate the age at which a child would be able to first perform the task:

(b) rate on a scale of 1 to 5 (with 1 as least influential) how influential they thought each of several factors were on the development of that particular skill.

Finally parents were asked a series of open-ended questions about how they would answer a child's questions about math, their own experiences with math, and their expectations for their children's performance in math.

Results

First an analysis of variance was performed to determine if there were differences in the estimated age given by parents as a result of the type of task, gender of the child, or whether or not they were describing their own or a typical child. Significant differences were found for all of these factors but there were no significant interactions between them (see Table 1).

Parents were also asked how influential they thought parents, school, peers, self-discovery, natural talents or television were in children's learning to solve the different tasks. We examined the relative importance of these possible sources of influence through a repeated measures analysis of variance (see Table 2).

In a third analysis, a multivariate approach was taken to examine whether or not there were differences in the influence attributed to the different factors associated with the type of task, child gender or whether or not the

parents were describing their own or a typical child. Again, there were significant main effects but no significant interaction effects (see Table 3).

Finally, the responses to the open-ended questions were categorized to examine parents' beliefs about the factors influencing future performance of their own child in mathematics (see Table 4).

Table 1

Comparison of the Age At Which Parents Estimated Children Would Be Able to Perform the Number Tasks

Effect Due to Content:

F (2;483) = 13.01 (p<.0001)

Mean Age for:	Compute	=	5.460
	Concept	=	5.503
	Count	=	4.981*

Effect Due to Gender:

F (1;483) = 16.09 (p<.0001)

Mean Age for:	Girls	=	5.452
	Boys	=	5.080

Effect Due to if Own or Typical Child:

F (1;483) = 55.24 (p<.0001)

Mean Age for:	Typical	=	5.640
	Own	=	4.988

* p <.05 (Tukey's post-hoc comparison)

Summary: Parents believe that children learn to count signficantly earlier than they learn computations or number concepts. Also, they believe that boys learn about numbers earlier than do girls and that their own children learn earlier than do typical children.

Table 2

Comparison of the Relative Influence of Different Factors on the Learning of Number Skills

Wilks' lambda multivariate F (5;470)= 388.57 (p<.0001)

Significant contrasts between factors (df=1;474 and p<.001):

Relative importance of each Factor (Mean)

Ranking:

(1) Parents (4.475) and School (4.463) (no difference)

(2) Natural Talents (3.119)

(3) Self-Discovery (2.957)

(4) Television (2.498)

(5) Peers (2.234)

Summary: Parents believe that adults (i.e., parents and teachers) are the most influential factors in children's learning of number skills. Next comes natural talents, self-discovery and television--in that order. Interactions with peers are seen by parents as being the least influential.

Table 3

Comparison of the Influence on Number Development of Different Factors

Wilks' lambda multivariate F-values, (df), and p-values:

For Content:	2.547	(12;938)	p<.003
For Child Gender:	2.802	(6;469)	p<.012
For Which Child:	8.807	(6;469)	p<.0001

Significant univariate analyses

Factors Influencing (Mean Ratings):

	Parents	School	Peers	Self	Talent	TV
Content:						
Compute	4.438*	4.556**	ns	ns	ns	ns
Concept	4.346	4.549				
Count	4.642	4.284				
Gender:						
Girls	ns	ns	2.147**	ns	ns	[illegible]**
Boys			2.383			[illegible]

Child:						
Typical	4.321*	4.609*	ns	ns	ns	2.667*
Own	4.630	4.317				2.329

* p<.01

** p<.05

Summary: Parents saw themselves as having more impact on the learning of counting than on other types of number tasks. They also said they had a greater effect on their own child's achievment than they perceived parents typically having. Parents rated schools as more influential in learning concepts and computations than for counting and as more influential for the typical child than for one's own child. Peers are rated as more influential for boys than for girls. Self-discovery and natural talents are not seen as having a differential influence on learning about numbers. Television, on the other hand, is more influential for boys than for girls and for the typical than for one's own child.

Table 4

Responses to the Open-Ended Questions

1. What advice would you have for the parent of a two-year-old who asked you how to make sure the child is ready for first grade math?

74% mention counting

22% mention reading

26% mention teaching addition and subtraction facts

(parents can be counted in more than one category)

2. How do you think your child will do in math?

81% my child will be above average

14% my child will be average

5% don't know

As support for their responses:

57% mention their child's current skills

33% mention they will teach their child math skills

19% mention the child's natural aptitude for math

Summary: Parent's responses to the open-ended questions were consistent with their responses on the structured interview. Most parents mentioned counting as an important preparatory skill for first grade math. The majority of parents predicted that their child would perform above average in math and supported their claims by describing their children's current skills. Despite rating themselves as the most important influence on their children's number development, only about 1/3 of the parents stated their intention to actively teach their children math skills.

Conclusions

The findings of this study help to answer the four questions that we posed.

1. When do parents think children solve tasks related to counting, number concepts, and computation? Parents predict that children will learn counting skills first and then computational and more complex number concepts later.

2. Do parents make different predictions about the skills of their own children and the average child? They expect their own children to learn all types of number skills earlier than other children will.

3. Do parents of girls make different predictions than parents of boys about their children's number skills? They expect boys to acquire math skills faster than girls.

4. What do parents think are the main influences on the development of children's number skills? They perceive parents and schools as having the greatest impact on children's early number development in general. Both self-discovery and innate mathematical abilities are less influential. Peers are seen as having very little impact at all. They also see themselves as having more impact on their own children than other parents have on theirs.

It appears that parental beliefs concerning number development best fit with a socialization model--especially a socialization model that emphasizes the importance of adults. However, even though they see themselves as the major influence in their children's learning about numbers, very few of them intend to take an active role in teaching their children about math.